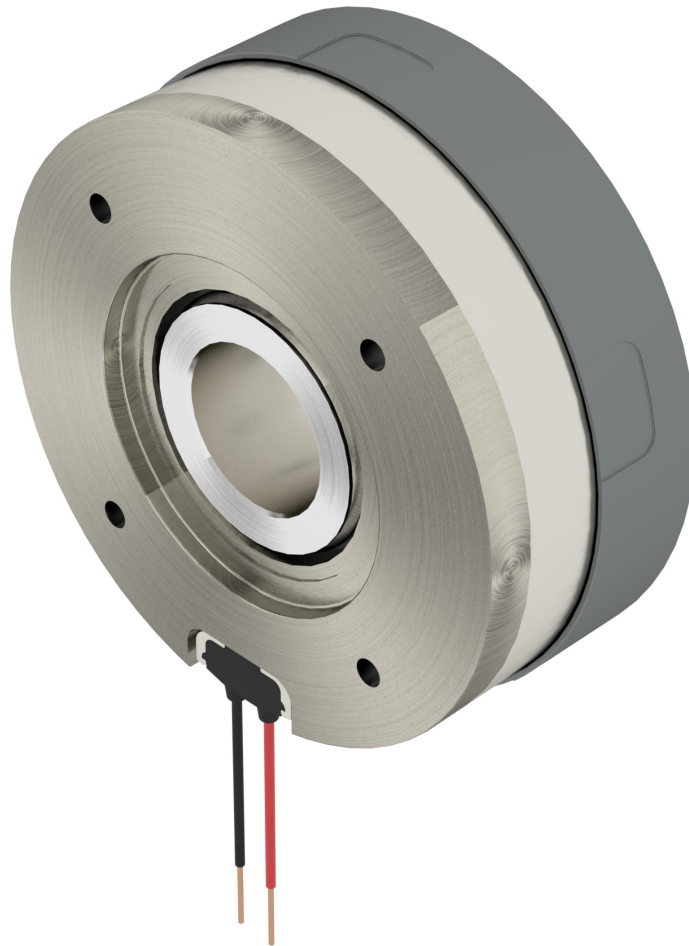




COMBIPERM TYPE P2

INSTRUCTIONS FOR USE | INSTALLATION

Translation of the original manual
Document 20466914 DE 00 | Vorserie

Preface

The described devices or add-on parts are products of the KEB Automation KG. The enclosed documents correspond to conditions valid at printing. Misprint, mistakes and technical changes reserved.

Signal words and symbols

Certain operations can cause hazards during the installation, operation or thereafter. There are safety informations in the documentation in front of these operations. Security signs are located on the device or machine. A warning contains signal words which are explained in the following table:

 DANGER	Dangerous situation, which will cause death or serious injury in case of non-observance of this safety instruction.
 WARNING	Dangerous situation, which may cause death or serious injury in case of non-observance of this safety instruction.
 CAUTION	Dangerous situation, which may cause minor injury in case of non-observance of this safety instruction.
NOTICE	Situation, which can cause damage to property in case of non-observance.

RESTRICTION

Is used when certain conditions must meet the validity of statements or the result is limited to a certain validity range.



Is used when the result will be better, more economic or trouble-free by following these procedures.

More symbols

- This arrow starts an action step.
- / - Enumerations are marked with dots or indents.
- => Cross reference to another chapter or another page.



Note to further documentation.
www.keb.de/service/downloads



Laws and guidelines

KEB Automation KG confirms with the EU declaration of conformity and the CE mark on the device nameplate or the signing that it complies with the essential safety requirements.

The EC declaration of conformity can be downloaded on demand via our website.

Warranty and liability

The warranty and liability on design, material or workmanship for the acquired device is given in the general sales conditions.



Here you will find our general sales conditions.
www.keb.de/terms-and-conditions



Further agreements or specifications require a written confirmation.

Support

Through multiple applications not every imaginable case has been taken into account. If you require further information or if problems occur which are not treated detailed in the documentation, you can request the necessary information via the local KEB Automation KG agency.

The use of our units in the target products is outside of our control and therefore lies exclusively in the area of responsibility of the customer.

The information contained in the technical documentation, as well as any user-specific advice in spoken and written and through tests, are made to best of our knowledge and information about the intended use. However, they are regarded as being only informal and changes are expressly reserved, in particular due to technical changes. This also applies to any violation of industrial property rights of a third-party. Selection of our units in view of their suitability for the intended use must be done generally by the user.

Tests can only be done within the intended end use of the product (application) by the customer. They must be repeated, even if only parts of hardware, software or the unit adjustment are modified.

Copyright

The customer may use the instructions for use as well as further documents or parts from it for internal purposes. Copyrights are with KEB Automation KG and remain valid in its entirety.

Other wordmarks or/and logos are trademarks (™) or registered trademarks (®) of their respective owners.

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1 Basic Safety Instructions

The following safety instructions have been created by the manufacturer for the area of drive technology. They can be supplemented by local, country- or application-specific safety instructions. This list is not exhaustive. Non-observance will lead to the loss of any liability claims.

NOTICE



Hazards and risks through ignorance.

- ▶ Read the instructions for use !
- ▶ Observe the safety and warning instructions !
- ▶ If anything is unclear, please contact KEB !

1.1 Target group

This manual is determined exclusively for technical staff. Technical staff for the purpose of this manual must have the following qualifications:

- Knowledge and understanding of the safety instructions.
- Skills for installation and assembly, start-up, operation and maintenance of the product.
- Understanding of the function in the used machine.
- Detection of hazards and risks of the drive technology.
- Knowledge about work safety and accident prevention.

1.2 Transport, storage and proper use

The transport is carried out by qualified persons in accordance with the environmental conditions specified in this manual.

Upon delivery the devices are to be checked for visible signs of transport damages. Immediately report transport damages to the transport company and the manufacturer.

Depending on its design and weight appropriate lifting devices must be used for handling.

In case of improper storage, no liability is assumed for resulting damages!

Don't store devices or parts

- in the environment of aggressive and/or conductive liquids or gases.
- with direct sunlight.
- outside the specified environmental conditions.
- in environments that can lead to corrosion and contamination.

1.3 Installation and mounting

NOTICE

Squeezing and pinching of fingers by self-rotation.

- ▶ Before installation, make sure that the drive is load-free.
- ▶ Secure drive against rotation.

Consider the following installation measures to prevent faults

- ▶ Do not operate the brake in an explosive environment. Consider the following installation measures to prevent faults
- ▶ Measures against freezing and/or formation of ice on the pole surfaces.
- ▶ Take appropriate measures against high air humidity, aggressive vapours/liquids or similar that lead to corrosion and 'rusting' of the pole surfaces.

1.4 Electrical connection

⚠ DANGER



Electrical voltage at brake and motor!

Danger to life due to electric shock!

- ▶ Only an electrician may work on the electrical power supply.
- ▶ When carrying out any work on the brake, switch off the supply voltage and secure it against switching on.
- ▶ Never bridge upstream protective devices (also not for test purposes).
- ▶ Standardised inspection of the protective earth conductor connection to all exposed metal parts.

1.5 Start-up and operation

The operation must not be started until it is determined that the installation complies with the machine directive; Account is to be taken of [EN 60204-1](#).

⚠ CAUTION

Pay attention to friction work (speed and the frequency of operation)!

Loss or drop of the braking torque!

- ▶ Exceeding the technical specifications may result in thermal overload at the braking surface or magnet. This may lead to failure of the brake.

⚠ CAUTION



High temperatures due to braking.

Burning of the skin!

- ▶ Cover hot surfaces safe-to-touch.
- ▶ If necessary, attach warning signs on the system.
- ▶ Check temperature and allow brake to cool down if necessary.

⚠ CAUTION

Rotating Parts.

Shock or crushing of body parts!

- ▶ Wear protective goggles against ejected parts and dirt particles, especially during first start-up.
- ▶ Take measures against being pulled into the machine.

1.6 Maintenance

- ▶ Secure the brake against being switched on accidentally during maintenance work.
- ▶ Make the brake load-free during maintenance work to avoid uncontrolled movements.
- ▶ Protection against the ingress of foreign particles into the air gap. These particles may impede the movement of the armature.
- ▶ When carrying out maintenance and repair work, the brake must not be energised.

In case of malfunction, unusual noises or smells inform a person in charge!

DANGER



Unauthorized exchange, repair and modifications!

Unpredictable malfunctions!

- ▶ The brake must not be converted, modified or misused.
- ▶ Only use original manufacturer parts.
- ▶ Infringement will annul the liability for resulting consequences.

1.7 Disposal

Electronic devices of the KEB Automation KG are exclusively professional devices for further industrial processing (so-called B2B devices).

Manufacturers of B2B devices are obliged to take back and recycle devices manufactured after 14.08.2018. These devices may not be disposed at the collection centres of public sector disposal organisations.



If no deviating agreement has been made between the customer and KEB or no deviating mandatory legal regulation exists, KEB products marked in this way can be returned. Company and keyword to the return point can be taken from the list below. Shipping costs are paid by the customer. Thereupon the devices will be professionally recycled and disposed.

The entry numbers are listed country-specific in the following table. The corresponding KEB return addresses can be found on our website.

Withdrawal by	WEEE-Reg.-No.	Keyword
Austria		
KEB Automation GmbH	ERA: 51976	Stichwort „Rücknahme WEEE“
France		
RÉCYLUM - Recycle point	ADEME: FR021806	Mots clés „KEB DEEE“
Germany		
KEB Automation KG	EAR: DE12653519	Stichwort „Rücknahme WEEE“
Italy		
COBAT	AEE: (IT) 19030000011216	Parola chiave „Ritiro RAEE“
Spain		
KEB Automation KG	RII-AEE 7427	Palabra clave „Retirada RAEE“
Česko		
KEB Automation KG	RETELA 09281/20 ECZ	Klíčové slovo: Zpětný odběr OEEZ
Slowakei		
KEB Automation KG	ASEKOL: RV22EEZ0000421	Klíčové slovo: "Spätný odber OEEZ"

The packaging must be feed to paper and cardboard recycling.

2 Product description

The COMBIPERM type P2 brake is an electro-magnetic released brake for dry running, whose force flow is generated by permanent magnets.

COMBIPERM P2 are powerful permanent-magnet brakes with frictional engagement and backlash-free effect. When energised, the magnetic field of the permanent magnets in the vicinity of the pole faces is cancelled out by the solenoid with the opposite polarity. The restoring force of the diaphragm spring on the anchor section ensures that the components are separated without any residual torque, regardless of the installation position.

2.1 Intended use

Permanent magnet brakes are used as holding brakes with an emergency stop function. It is not intended for continuous dynamic use.

The operational reliability of the brake is only guaranteed when used according to specified application. In this context, specified application means that the brake is used for the ordered and confirmed purpose.

Any other use is considered a breach of specified application. It may pose unforeseeable risks and is solely and exclusively the responsibility of the operating company.

Technical data and information for connection conditions shall be taken from the instructions for use and must be strictly observed. Any use beyond the technical specifications is also considered as not specified.

The actual use of the brake in the target products is beyond KEB Automation KG's control and, therefore, shall be exclusively within the operating company's responsibility.

Restriction

If the product is used in machines which work under exceptional conditions or if essential functions, life-supporting measures or an extraordinary safety step must be fulfilled, the necessary reliability and security must be ensured by the machine builder.

2.2 Residual risks

The brake may overheat due to wrong design or changed operating requirements. This may lead to failure of the brake. Machine parts made of magnetic material which are close to the magnet can weaken the torque and result in a change of the release range. The brake must be adjusted in this case.

2.3 Improper use

Improper use exists, if

- the product is operated outside the limit values specified in the technical data.
- unauthorized structural changes have been made to the brake.
- improper repairs have been carried out.
- the product has been incorrectly installed or serviced.

In case of infringements, the brake loses its EU conformity and the liability claims against KEB Automation KG expire.

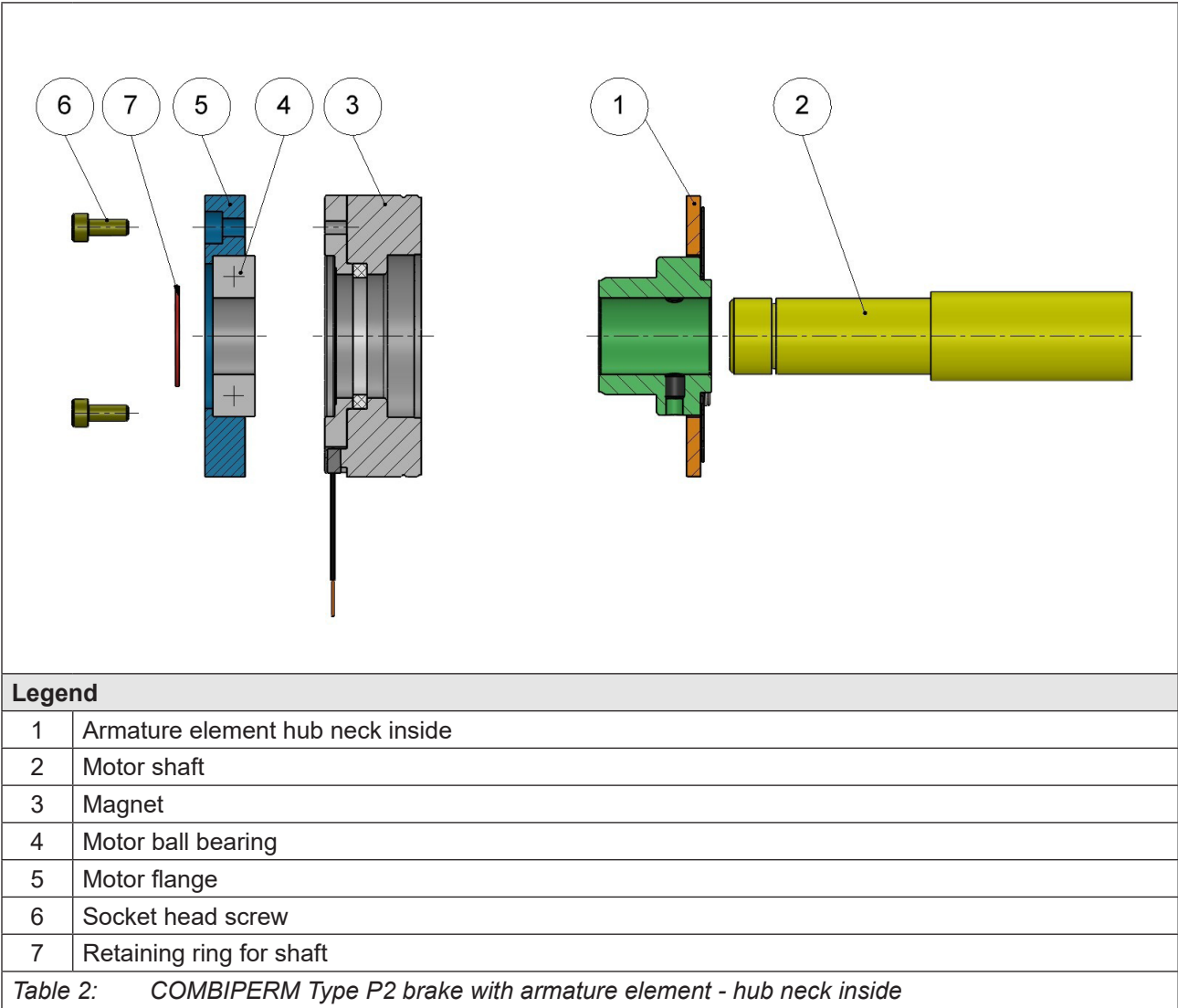
2.4 Type code

The type designation and the version can be found on the nameplate or on the marking.

xx										P2										x										x										x										-										x										x										x										x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

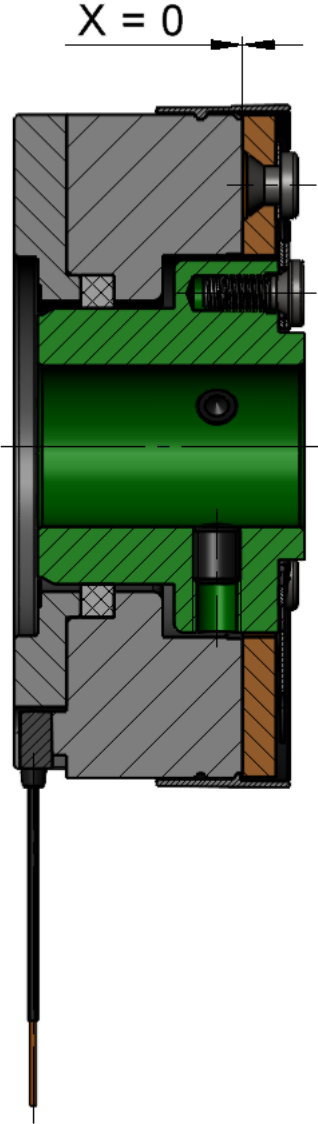
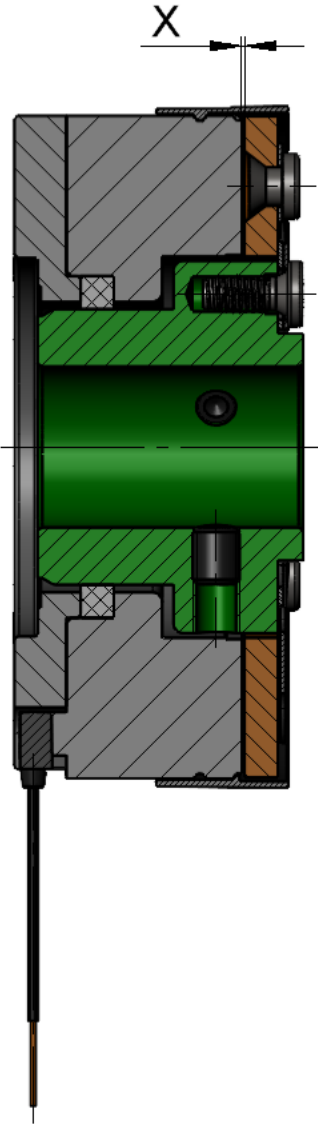
2.5 Overview COMBIPERM P2

2.5.1 COMBIPERM Type P2 brake with armature element - hub neck inside



2.6 Functional description

The force action of a permanent magnetic field is used in power-off condition for torque buildup, whereupon the armature plate is drawn to the magnet. The result is a frictionally engaged, torsional backlash-free connection. Applying a voltage with the correct polarity (rated voltage $\pm 10\%$) displaces the permanent magnetic field; in conjunction with the diaphragm spring on the armature, this results in the separation of the friction surfaces, which is independent of the installation position and free of residual torque.

	
Brake de-energised	Brake energised
<i>Table 3: Functional description</i>	

3 Technical data

3.1 Operating conditions

3.1.1 Climatic environmental conditions

Application case	Standard	Class	Notes
Storage	DIN EN IEC 60721-3-1	1K21	–
Transport	DIN EN IEC 60721-3-2	2K12	–
Operation	DIN EN IEC 60721-3-3	3K22	Ambient temperature -40 °C...120 °C, non-condensing
Table 4: Climatic environmental conditions			

3.1.2 Mechanical environmental conditions

Application case	Standard	Class	Notes
Storage	DIN EN IEC 60721-3-1	1M1	–
Transport	DIN EN IEC 60721-3-2	2M4	–
Operation	DIN EN IEC 60721-3-3	3M12	–
Table 5: Mechanical environmental conditions			

3.1.3 Electrical operating conditions

Requirement	Standard	Class	Notes
Overvoltage category	EN 60664-1	III	–
Table 6: Device classification			

3.1.4 Specific environmental conditions

Application case	Standard	Class	Notes
Operation	DIN EN IEC 60721-3-3	3Z12	Also 3Z14 and 3Z2
Table 7: Specific environmental conditions			

3.1.5 Biological conditions

Application case	Standard	Class	Notes
Storage	DIN EN IEC 60721-3-1	1B1	–
Transport	DIN EN IEC 60721-3-2	2B1	–
Operation	DIN EN IEC 60721-3-3	3B1	–
Table 8: Biological conditions			

3.1.6 Chemically active substances

Application case	Standard	Class	Notes
Storage	DIN EN IEC 60721-3-1	1B1	–
Transport	DIN EN IEC 60721-3-2	2B1	–
Operation	ISO 9223	C2	–
Table 9: Chemically active substances			

3.1.7 Mechanically active substances

Application case	Standard	Class	Notes
Storage	DIN EN IEC 60721-3-1	1S11	–
Transport	DIN EN IEC 60721-3-2	2S5	–
Operation	DIN EN IEC 60721-3-3	3S6	–
Table 10: Mechanically active substances			

3.2 Device data COMBIPERM Type P2

3.2.1 Overview

Device size			03	04	05	06	07
Torque		M_2 / Nm	2,8	6	11	14	20
Min. static torque at 120 °C		$M_{4min120^{\circ}C}$ / Nm	2,3	5	9	11,5	16
Rated power at 20 °C		P_{20} / W	10,5	12	13,6	14,4	16,4
Rated voltage		U_{N_dc} / V	24				
Cyclic duration factor		ED / %	100				
Maximum frictional work		nWR_{max} / min ⁻¹	3000				
		WR_{max} / kJ	0,3	0,4	0,6	0,9	1,5
Max. operating speed		n_{max} / rpm	12000	10000			
Max. braking speed		nB_{max} / rpm	6000				
Mass moment of inertia armature element P2.810/910		J / 10 ⁻³ kgm ²	0,0051	0,0158	0,0369	0,0622	0,1223
Mass moment of inertia armature element P2.820/920		J / 10 ⁻³ kgm ²	0,0058	0,0189	0,0434	0,0729	0,1431
Air gap		X_{min} / mm	0,2	0,2	0,3	0,3	0,3
Max. air gap at 20 °C		$X_{max_{20}}$ / mm	0,4	0,4	0,55	0,7	0,7
Max. air gap at 120 °C		$X_{max_{120}}$ / mm	0,35	0,35	0,5	0,5	0,6
Response delay DC	1)	t_{11_dc} / ms	≤ 10				≤ 15
Separation time	2)	t_2 / ms	≤ 40	≤ 50	≤ 60	≤ 100	≤ 100
ISO class			F				
Type of protection	3)		IP30				

Table 11: Device data COMBIPERM Type P2

Table 11: Device data COMBIPERM Type P2

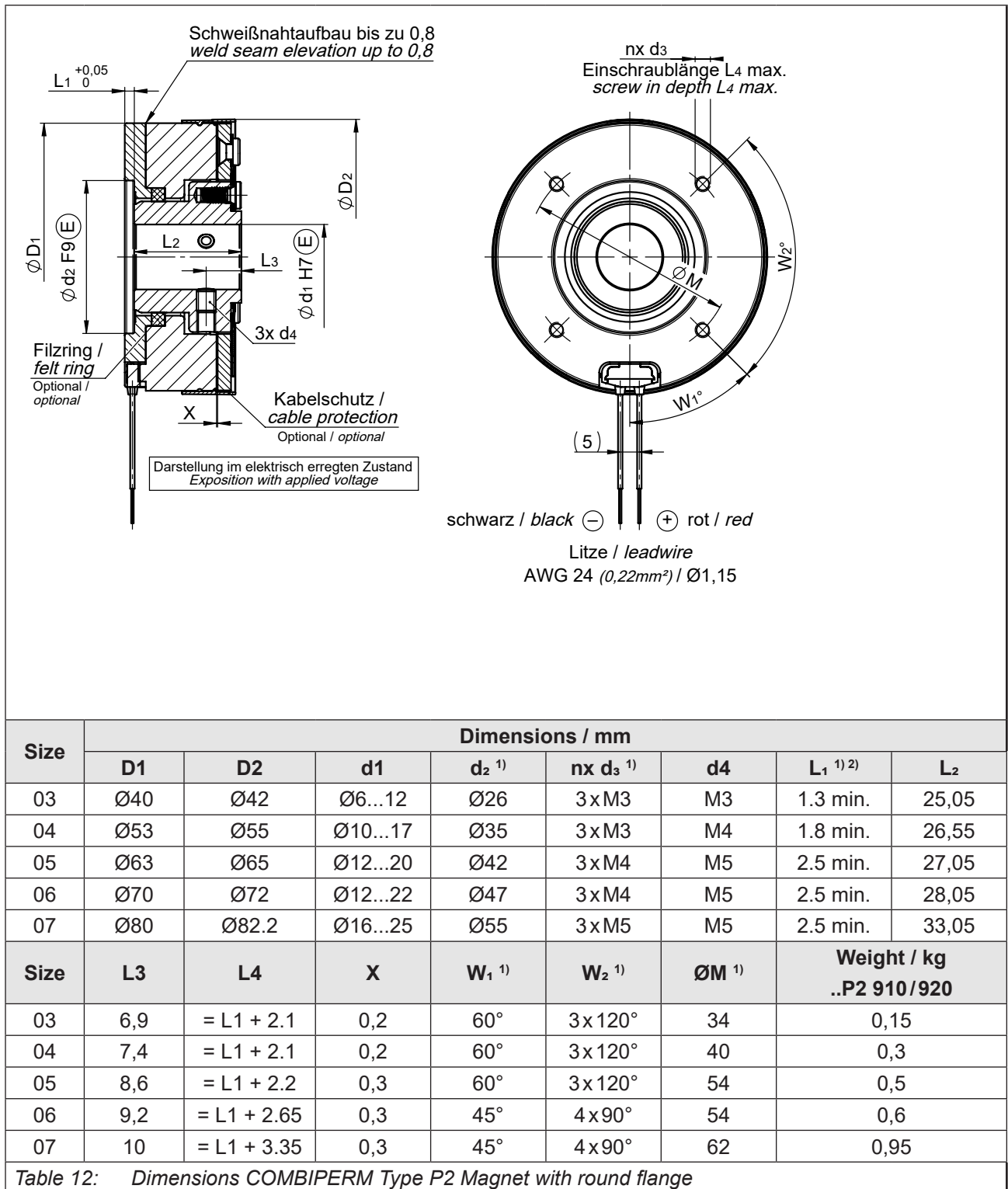
¹⁾ Time from switching off the current to the increase of the torque.

²⁾ Disengagement time from power-on to the beginning of the torque drop.

³⁾ With cable protection.

3.3 Dimensions and weights

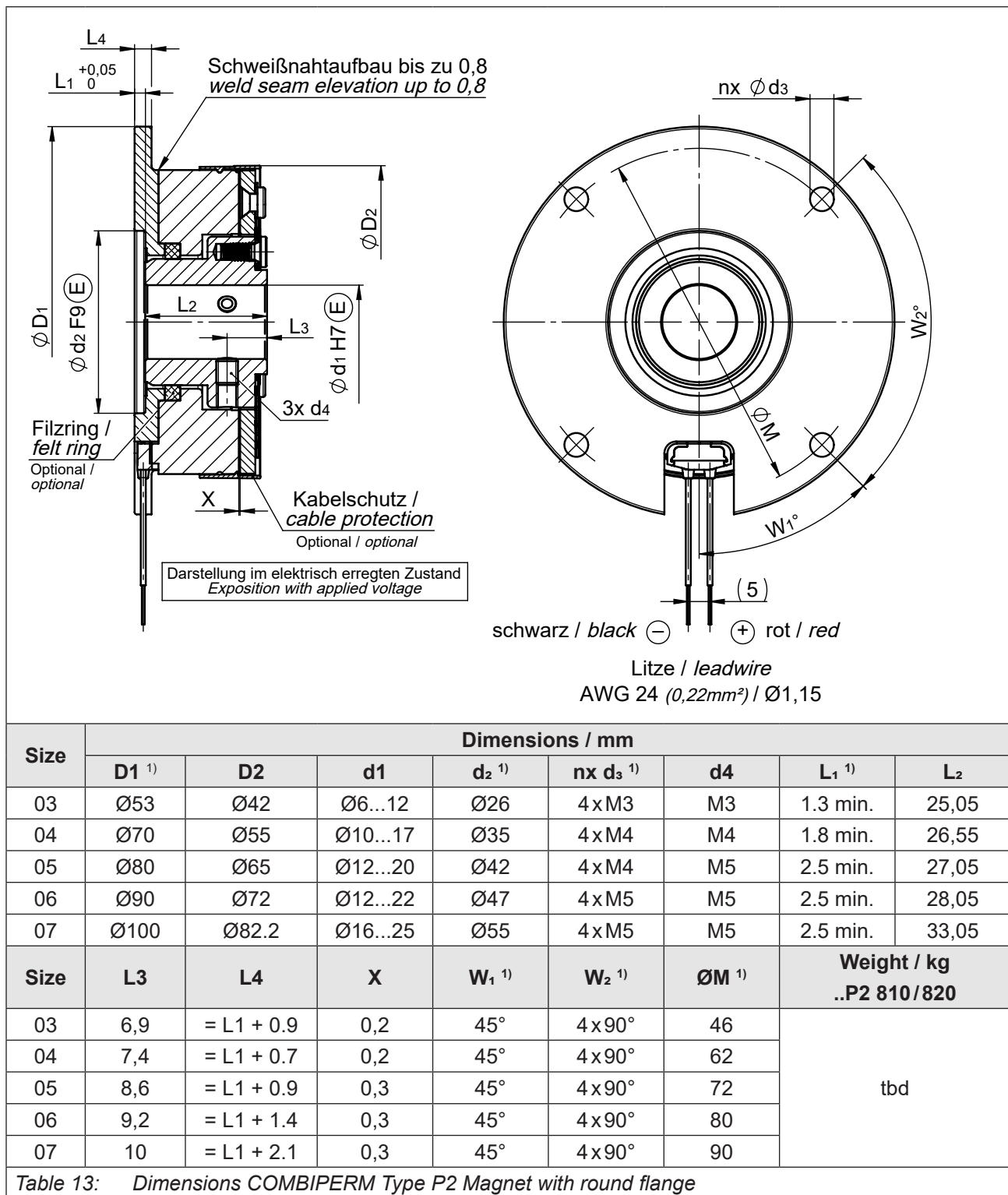
3.3.1 Magnet with standard flange



¹⁾ Default values, freely selectable.

²⁾ Minimum value; higher values are possible.

3.3.2 Magnet with external flange



¹⁾ Default values, freely selectable.

4 Mounting

4.1 Notes on assembly

Check before mounting the brake

Before mounting the brake, check the following:

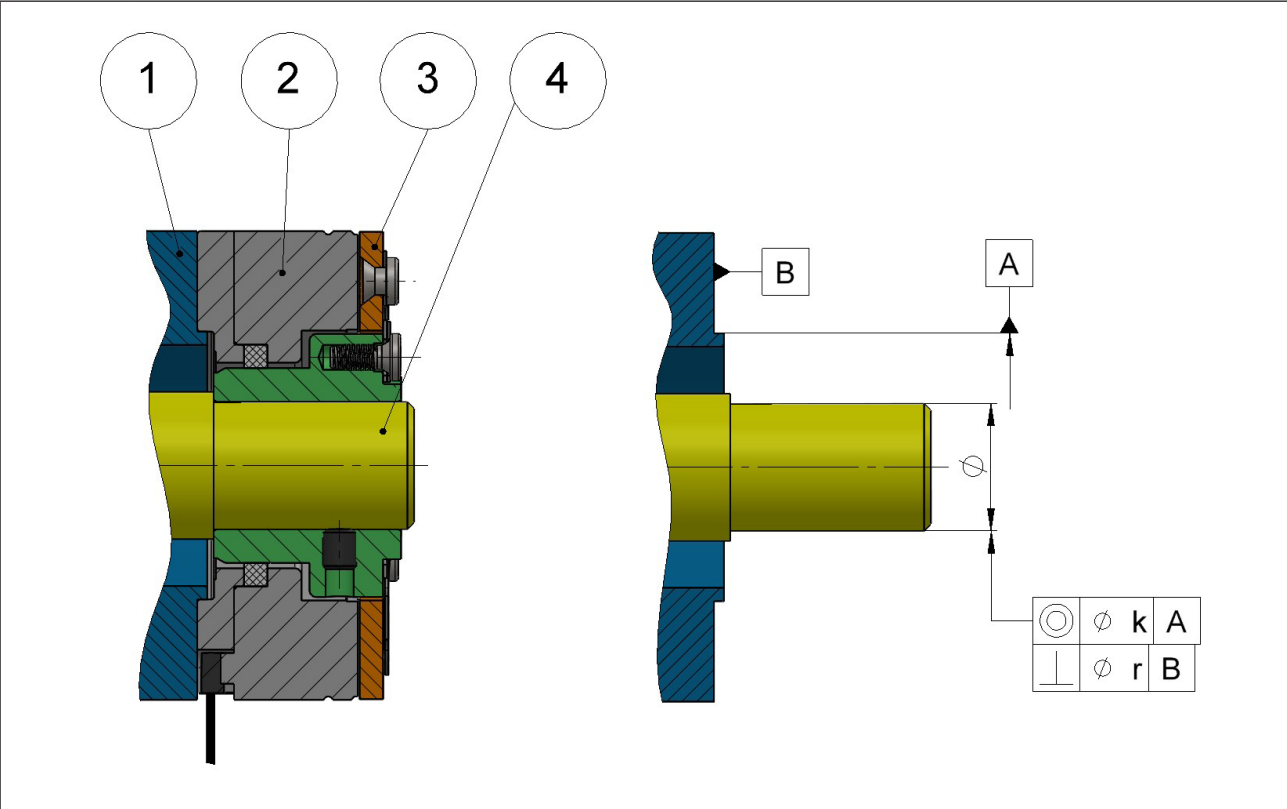
- ▶ Compliance of the ordered voltage and performance data with the type plate data.
- ▶ No damage to the brake or contamination by foreign particles in the area of operation or in the air gap of the brake.
- ▶ The friction surfaces must be free from grease and oil.
- ▶ Air humidity, aggressive vapours/liquids or similar can lead to corrosion and 'rusting' of the pole surfaces. In this case, the user needs to provide appropriate measures!
- ▶ To separate the magnet and the armature, an electrical voltage equal in magnitude and type to the operating voltage must be applied to the brake's electrical terminals, ensuring correct polarity.
- ▶ Readjustment of the air gap is not possible! If necessary, check the air gap before mounting => „9.2.1 Check air gap“.

Observe during mounting**NOTICE****Risk of damage to the brake**

- ▶ Mounting of the armature element is permitted only in energized condition to avoid overexpansion of the diaphragm spring at the armature element. Magnet and armature element must be centered at mounted brakes. Plan and radial run-outs cause premature failure!

During mounting, please observe the following notes/instructions:

- ▶ The friction surfaces of the brake must not come into contact with oil, grease, water or other fluids. Any contamination will result in loss of torque.
- ▶ Never use aggressive fluids (for example, cleaning agents) or the like to clean the brake.
- ▶ The movement of the armature must not be impeded by the ingress of foreign particles into the air gap. Take appropriate safety measures as required.
- ▶ The armature element of the brake is mounted on a shaft. The armature may not be centered at the in and outside diameter. It must be able to move free, because it must be placed through the riveted spring. This shaft must maintain the concentricity (to A) and perpendicularity (to B) specified in the table, => „[Table 14: Concentricity k between magnet centering and shaft \(armature bore\)](#)“.
- ▶ A gap of up to 0.2 mm is permissible between the motor mounting plate and the brake flange when the system is not under tension, => „[Table 15: Gap between the motor mounting plate and the brake flange](#)“.
- ▶ When using a cable protector, ensure that the ring is securely in place. Excessive disassembly cycles can cause play to develop; in this case, the ring should be replaced.
- ▶ The use of a felt ring can lead to residual brake torque even when the brakes are bled.



Legend					
1	Customer flange				
2	Magnet				
3	Armature element				
4	Customer shaft				
Size	03	04	05	06	07
k / mm	0,1	0,1	0,1	0,2	0,2
r / mm	0,04	0,04	0,06	0,06	0,06

Table 14: Concentricity k between magnet centering and shaft (armature bore)

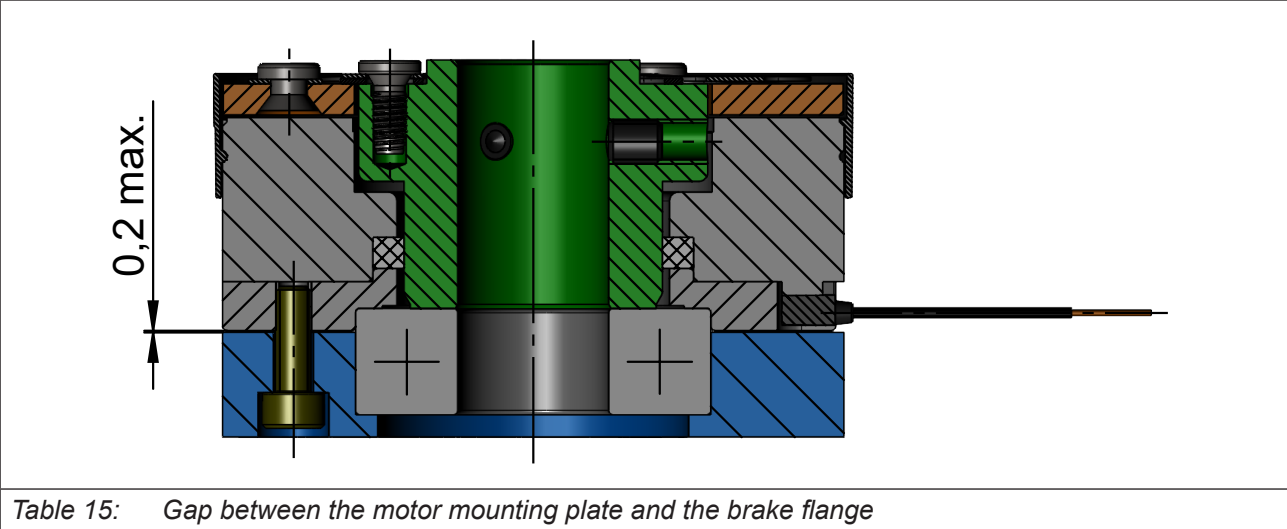


Table 15: Gap between the motor mounting plate and the brake flange

4.2 Mounting the brake

4.2.1 Mounting the magnets for brakes

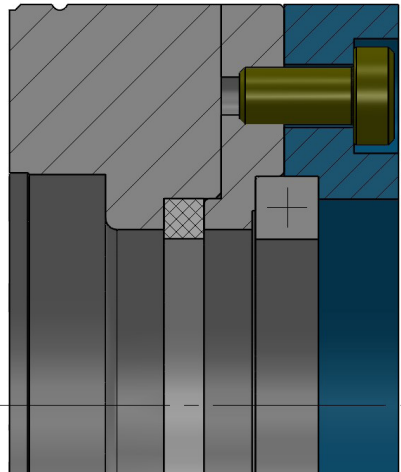
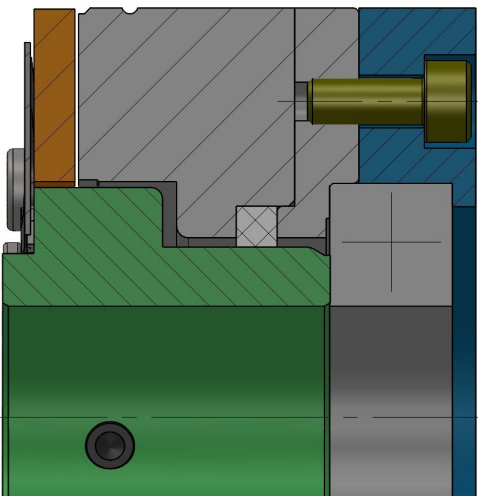
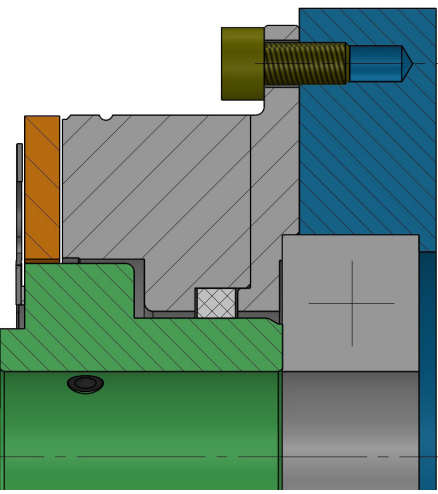
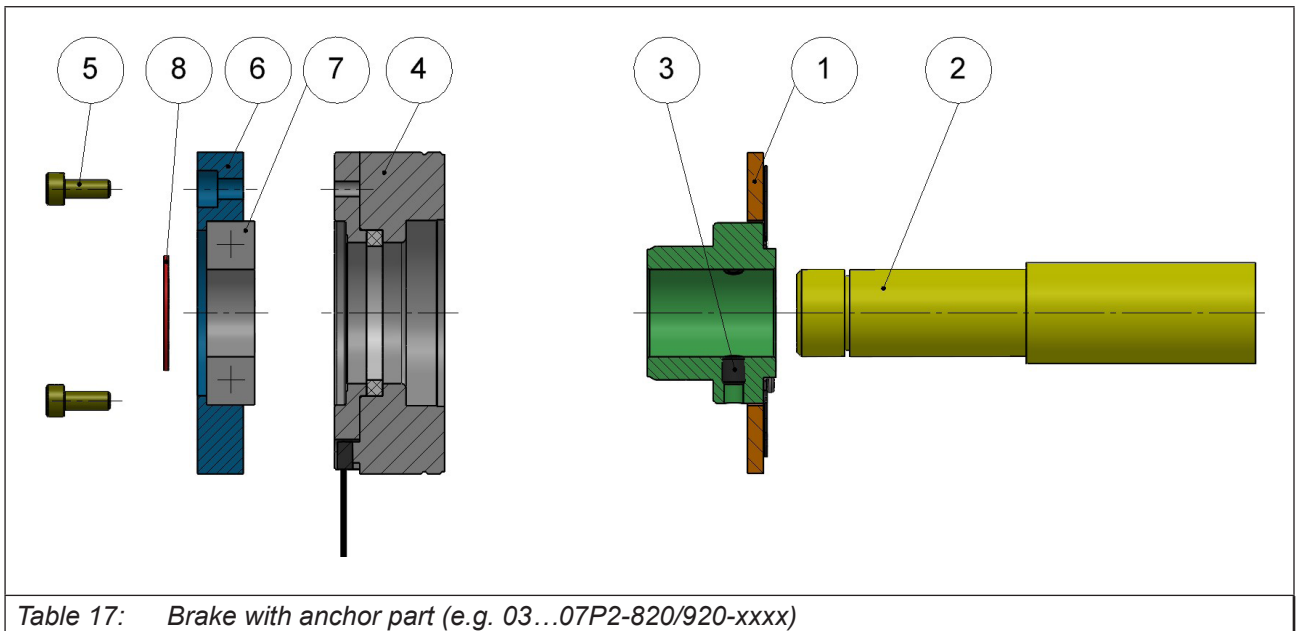
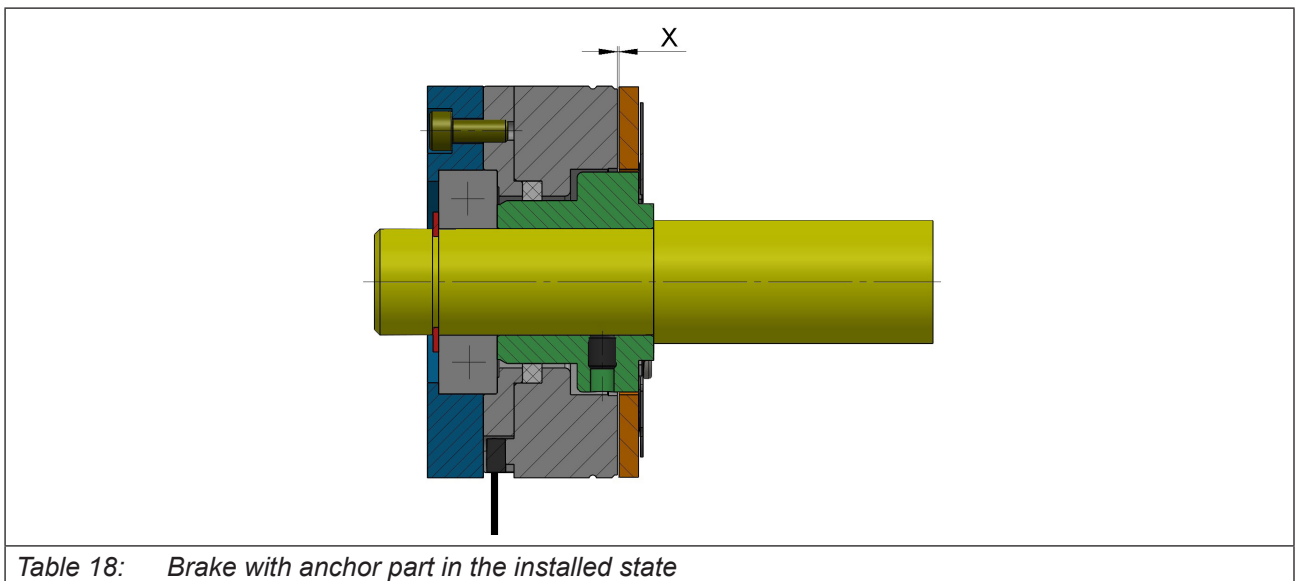
	Outside centering (e.g. Type 910920 in size 03...07) The magnet can be centered via the inside diameter of the magnet and screwed to the mounting surface with socket head screws (e.g. DIN 4762, 8.8). Pay attention to the screw-in depth for magnets without flange since otherwise the magnet can be damaged!  The mounting screws must be tightened evenly to the specified tightening torque using a torque wrench.
	Fixing the magnet face-mounted at the magnet back (e.g. Type 910920 in size 03...07) At versions magnet without flange (e.g. xx P2 910920-xxxx), the magnet is face-mounted with the magnet back to the motor flange site with socket head screws.  The mounting screws must be tightened evenly to the specified tightening torque using a torque wrench.
	Fixing the magnet at the flange (e.g. Type 810 / 820 in size 03...07) At versions magnet without flange (e.g. xx P2 810 / 820-xxxx), the magnet is face-mounted with the magnet back to the motor flange site with socket head screws.  The mounting screws must be tightened evenly to the specified tightening torque using a torque wrench.

Table 16: Installation of the magnets

4.2.2 Brake with armature element – hub neck inside (e.g. 03...07P2-820/920-xxxx)



- ▶ Fit the armature (1) with the hub onto the motor shaft (2).
- ▶ Secure the armature component (1) axially on the motor shaft (2) using the set screws (3).
- ▶ Mount the magnet (4) to the motor flange (6) using the cylinder screws (5), => „4.2.1 Mounting the magnets for brakes“. Tighten the socket head screws with the recommended tightening torque.
- ▶ A retaining ring (8) is to be used to axially secure the bearing. The hub consequently rests against the inner ring of the motor ball bearing (7). The air gap X must occur automatically by design, if necessary it can be adjusted with adjusting washer between armature element (1) and bearing / shaft (7 / 2).



Check air gap X.

Further information on the air gap which becomes larger as a result of wear can be found in section => „9.2.1 Check air gap“.

5 Electrical connection

DANGER



Electrical voltage at the motor!

Danger to life due to electric shock!

- ▶ When carrying out any work on the brake, switch off the supply voltage to the motor and secure it against switching on.

NOTICE

Voltage peaks when switching off!

- ▶ Install protective circuit for brake and control.
- ▶ The protective circuit leads to longer connection times.

NOTICE

Destruction of the brake in case of incorrect voltage supply!

- ▶ The brake is operated with DC voltage (operation with rated voltage $\pm 10\%$).
- ▶ Read the rated voltage from the nameplate of the brake.
- ▶ Compare with existing voltage source.
- ▶ The maximum input voltage U_{in} must not be exceeded.
- ▶ Only connect if the values match.



When using rectifiers, the use of bridge rectifiers is recommended.

The brake COMBIPERM Type P2 is delivered with factory-preassembled connecting cables:

COMBIPERM P2	03...07
Connection cross section	AWG24
Connection length	250 mm
Table 19: Connecting the brake	



Influence of rectifiers on the connection time!

The brake can be switched off on the DC or AC side when voltage is supplied via a rectifier. Switching off on the DC side reduces the connection time, i.e. the period of time until the torque is reached to decelerate.

6 Start-up

6.1 Check prior to start-up of the brake

Visual inspection

- Do connection and rated voltage (nameplate) agree?
- Are external damages visible?
- Are there impurities in the functional area or foreign bodies in the air gap of the brake?

Load-free testing

- Ensure that the brake is unloaded.
- Release/close the brake by switching the voltage supply.

NOTICE

Damage due to non-observance!

- Do not start up if one of the checks is not OK.

6.1.1 Run in of the brake

NOTICE

Damage due to insufficient braking torque!

- The torque is only reached after the brake has run in.

As standard, brakes are brought to rated torque after installation by initial running-in. If required, KEB can carry out the initial run-in. In this case, only an adjustment run with reduced circuits is required.



The initial run-in => „[6.1.1.1 Initial run-in](#)“ and the refreshment => „[9.2.3 Refreshment of the brake](#)“ must be carried out in accordance with the P2 run-in instructions in order to achieve the specified torques.

CHECK PRIOR TO START-UP OF THE BRAKE

6.1.1.1 Initial run-in

Instructions for the first enema:

- First running-in at the customer, 100 % run-in at KEB.

Device size	03	04	05	06	07	08
Slip time t / s	1					
Idle time t / s	0,5					
Speed n / rpm	200	125	100			50
Circuits	50			30	25	
Table 20: Run in of the brake						

Notes on running-in process:

- Energise the magnet.
- Rotate the drive/motor with the specified speed „Table 20: Run in of the brake“.
- Do not energise the magnet.
- Allow the brake to slip in accordance with the slip time (=> „Table 20: Run in of the brake“).
- Apply power to the brake in accordance with the idle time (=> „Table 20: Run in of the brake“).
- Repeat the cycles as per the initial run-in or refreshment (=> „Table 20: Run in of the brake“).
- Stop the drive/motor.
- Check the torque.
- If the torque is not reached, repeat the process.

NOTICE

Damage due to loss of braking torque!

If the brake is only used as a holding brake without dynamic load, the braking torque may drop. A new running-in (refreshment) must be done within the scope of maintenance, => „9.2.3 Refreshment of the brake“.

7 Operation

The brake is activated solely via the power supply, => „[5 Electrical connection](#)“. There are no manual operating options. The maximum number of switching cycles must not be exceeded => „[3.2 Device data COMBIPERM Type P2](#)“.

8 Troubleshooting

The following table shows some causes and solutions of malfunctions during brake operation. If this does not solve the problem or if other malfunctions occur, please contact our service department.

Malfunction	Cause	Measures
Brake does not release	Incorrect voltage	Only operate the brake with the correct voltage (see nameplate of the brake).
	Rectifier failed	Replace the rectifier.
	Foreign particles between armature and lining	Remove the foreign particles. Use non-greasing cleaning agents to clean the brake.
	Magnet coil or connecting cable defective	Replace the brake.
	Excessive heating	Install a high-speed circuit breaker (for example, KEB Powerbox).
No braking function	Air gap too large, maximum air gap reached	Replace the brake.
	Friction surfaces contaminated	Clean the friction surfaces, replace if necessary.
Brake operates with delay, long connection time	Brake is switched on AC side	Switch the brake on the DC side.
<i>Table 21: Troubleshooting</i>		

9 Maintenance and service

- Observe the general safety instructions.
- The brake must not be under voltage during maintenance and repair work!
- Protect electrical and electronic components from splash water.

9.1 Maintenance intervals

The brake COMBIPERM type P2 is mainly maintenance-free. As a result of wear occurring during operation, the air gap increases. The function of the brake can only be ensured when the air gap X is checked at regular intervals.

9.2 Service

Service is required if, in accordance with the fault table, there are symptoms of damaged or soiled coverings, unusual noises or smells.

⚠ CAUTION



Limbs crushed!

Securing the load!

- ▶ Mechanically secure the load against unintended movement.
- ▶ Release brake from load.
- ▶ Dismounting of the brake according to manual.

9.2.1 Check air gap

As a result of wear occurring during operation, the air gap increases. To ensure proper functioning, the air gap X needs to be checked at regular intervals. When checking the air gap pay attention that parallelism and axial run-out tolerances must be added to the nominal air gap X.

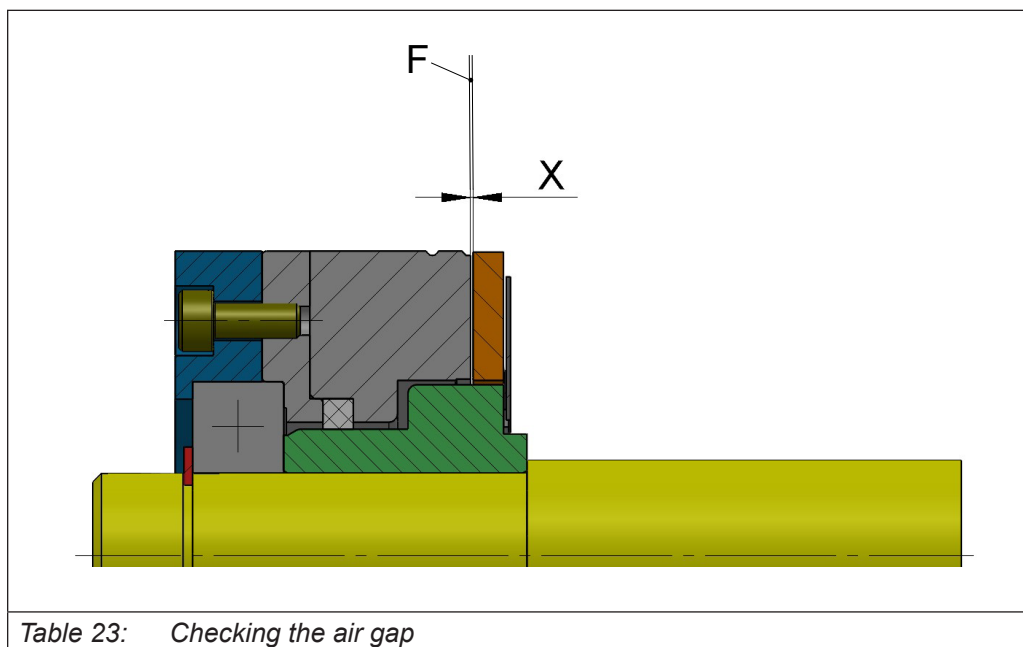
Size	Air gap	
	Rated value X	Limit value $X_{\max}$ ¹⁾
	mm	mm
03	0,2	0,4
04	0,2	0,4
05	0,3	0,55
06	0,3	0,7
07	0,3	0,7

Table 22: Check air gap

¹⁾ The air gap (at 20°C) at which replacement is required.

9.2.1.1 Checking the air gap X

- ▶ Use a feeler gauge (F) to check the air gap X.
- ▶ The brake must be replaced if the air gap X is greater than $X_{\max}$.



9.2.2 Exchange the brake

- ▶ If the unit or any of its individual components need to be replaced, the entire unit must be replaced.
- ▶ Remove the brake, => *“10.1 Dismantling”*.
- ▶ The brake is mounted in reverse order of mounting, => *“4.2.2 Brake with armature element – hub neck inside (e.g. 03...07P2-820/920-xxxx)”*.
- ▶ Functional testing and commissioning, => *“9 Maintenance and service”*.

9.2.3 Refreshment of the brake

NOTICE

Damage due to loss of braking torque!

If the brake is only used as a holding brake without dynamic load, the braking torque may drop. A new run in (refreshment) must be done within the scope of maintenance.

Refreshment application:

- Commissioning at the customer's premises, provided that functional commissioning has already been carried out by KEB.
- Brake recovery due to unfavorable operating conditions.

Device size	03	04	05	06	07	08
Slip time t / s	1					
Idle time t / s	0,5					
Speed n / rpm	200	125	100			50
Circuits	10				5	
Table 24: Run in of the brake						

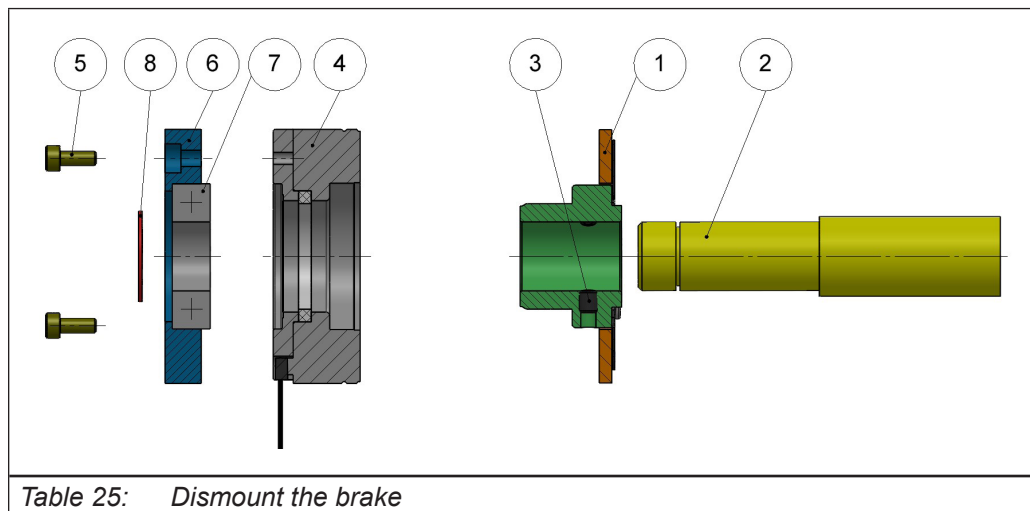


- A maintenance interval of 4 weeks is recommended for normal industrial applications.
- A maximum of 3 repeat runs may be carried out if the test torque is not achieved.

10 Dismantling and disposal

10.1 Dismantling

- ▶ The dismantling is carried out under voltage supply
- ▶ First, the fixing screws (5) must be removed. Next comes the motor mounting plate (6).
- ▶ Remove the retaining ring (8), the bearing (7) and the magnet assembly (4) from the brake.
- ▶ Remove the armature element from the shaft (to this end, refer to the instruction manual of the motor). The grub screws (3) must be loosened for this.



10.2 Disposal



Separated according to the materials used, dispose of the electromagnetic brake components in compliance with the applicable local environmental regulations.

The corresponding key numbers are subject to change depending on the disassembling process (metals, plastics and cables).

The components can be disposed of as follows:

Magnet with coil, cables and all other steel parts:

Steel scrap

(Key No.: EAK 12 01 02)

Aluminium components:

Nonferrous metals (this includes copper)

(Key No.: EAK 16 01 18)

11 Certification

11.1 EU declaration of conformity

EU Declaration of Conformity => „[11.2 Further information and documentation](#)“.

11.2 Further information and documentation

You find supplementary manuals and instructions for the download under www.keb-automation.com/de/suche

General manuals

- EMC and safety instructions
- Manuals for additional control boards, safety modules, fieldbus modules, etc.

Instruction and information for construction and development

- Input fuses in accordance with UL
- Programming manual for control and power unit
- Motor configurator to select the appropriate drive controller and to create downloads for parameterising the drive controller

Approvals and approbations

- Declaration of conformity CE
- TÜV certificate
- FS certification

Other markings and approvals not listed here are indicated, where applicable, by a corresponding logo on the type plate or device. The relevant evidence/certificates are available on our website.

Others

- COMBIVIS, the software for comfortable parameterisation of the drive controllers via a PC (available via download)
- EPLAN drawings

12 Revision history

Version	Date	Description
00	2026-05	Pre-series

Glossary

0V	Earth-potential-free common point	Encoder emu- lation	Software-generated encoder output
1ph	1-phase mains	End customer	The end customer is the user of the customer product
3ph	3-phase mains	Endat	Bidirectional encoder interface of the company Heidenhain
AC	AC current or voltage	EtherCAT	Real-time Ethernet bus system of the company Beckhoff
AFE	From 07/2019 AIC replaces the previous name AFE	Ethernet	Real-time bus system - defines protocols, plugs, types of cables
AFE filter	From 07/2019 AIC filter replaces the previous name AFE filter	FE	Functional earth
AIC	Active Infeed Converter	FSoE	Functional Safety over Ethernet
AIC filter	Filter for Active Infeed Converter	FU	Drive controller
Application	The application is the intended use of the KEB product	GND	Reference potential, ground
ASCL	Asynchronous sensorless closed loop	GTR7	Braking transistor
Auto motor ident.	Automatically motor identification; calibration of resistance and inductance	HF filter	KEB specific term for an EMC filter (for description see EMC filter).
AWG	American wire gauge	Hiperface	Bidirectional encoder interface of the company Sick-Stegmann
B2B	Business-to-business	HMI	Human machine interface (touch screen)
BiSS	Open source real-time interface for sensors and actuators (DIN 5008)	HSP5	Fast, serial protocol
CAN	Fieldbus system	HTL	Incremental signal with an output voltage (up to 30V) -> TTL
c.d.f.	Cyclic duration factor	IEC	IEC xxxxx stands for an international standard of the International Electro-technical Commission
CDM	Complete drive module including auxiliary equipment (control cabinet)	IPxx	Protection class (xx for class)
COMBIVERT	KEB drive controller	KEB product	The KEB product is subject of this manual
COMBIVIS	KEB start-up and parameterizing software	KTY	Silicium temperature sensor (polarized)
Customer	The customer has purchased a KEB product from KEB and integrates the KEB product into his product (customer product) or resells the KEB product (dealer)	Manufacturer	The manufacturer is KEB, unless otherwise specified (e.g. as manufacturer of machines, engines, vehicles or adhesives)
DC	DC current or voltage	MCM	American unit for large wire cross sections
DI	Demineralized water, also referred to as deionized (DI) water	Modulation	Means in drive technology that the power semiconductors are controlled
DIN	German Institut for standardization	MTTF	Mean service life to failure
DS 402	CiA DS 402 - CAN device profile for drives	NHN	Standard elevation zero; based on the specified height definition in Germany (DHHN2016). The international data generally deviate from this by only a few cm to dm, so that the specified value can be applied to the regionally applicable definition.
ELV	Extra-low voltage	OC	Overcurrent
EMC filter	EMC filters are used to suppress conducted interferences in both directions between the drive controller and the mains	OH	Overheat
Emergency stop	Shutdown of a drive in emergency case (not de-energized)	OL	Overload
Emergency switching off	Switching off the voltage supply in emergency case		
EMS	Energy Management System		
EN	European standard		

OSSD	Output signal switching device; - an output signal that is checked in regular intervals on its shutdown. (safety technology)
PDS	Power drive system incl. motor and measuring probe
PE	Protective earth
PELV	Protective Extra Low Voltage
PFD	Term used in the safety technology (EN 61508-1...7) for the size of error probability
PFH	Term used in the safety technology (EN 61508-1...7) for the size of error probability per hour
PLC	Programmable logic controller
Pt100	Temperature sensor with $R_0=100\Omega$
Pt1000	Temperature sensor with $R_0=1000\Omega$
PTC	PTC-resistor for temperature detection
PWM	Pulse width modulation
RJ45	Modular connector with 8 lines
SCL	Synchronous sensorless closed loop
SELV	Safe extra-low voltage, unearthed
SIL	The safety integrity level is a measure for quantifying the risk reduction. Term used in the safety technology (EN 61508 -1...7)
SS1	Safety function „Safe stop 1“ in accordance with IEC 61800-5-2
SSI	Synchronous serial interface for encoder
STO	Safety function „Safe Torque Off“ in accordance with IEC 61800-5-2
TTL	Logic with 5 V operating voltage
USB	Universal serial bus
VARAN	Real-time Ethernet bus system

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